INDIANA DEPARTMENT OF TRANSPORTATION
MATERIALS AND TESTS DIVISION

LABORATORY TESTING OF CHEMICAL ANCHOR SYSTEMS
ITM No. 807-00T

1.0 SCOPE

1.1 This test method covers the procedure for the laboratory testing of chemical anchor systems by installing grade 400 (60), #22 (#7) epoxy coated deformed steel reinforcing bar and applying a tensile load equal to the yield of the reinforcing bar.

1.2 The values stated in either SI metric or acceptable English units are to be regarded separately as standard, as appropriate for a specification with which this ITM is used. Within the text, English units are shown in parenthesis. The values stated in each system may not be exact equivalents; therefore each system shall be used independently of the other, without combining values in any way.

1.3 This ITM may involve hazardous materials, operations, and equipment. This ITM does not purport to address all of the safety problems associated with the ITM's use. The ITM user's responsibility is to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2.0 TERMINOLOGY

2.1 Terms and Abbreviations. Definitions for terms and abbreviations shall be in accordance with the Department’s Standard Specifications, Section 101, except as follows.

2.1.1 Chemical anchor system is a high strength adhesive material used to chemically anchor steel reinforcing bar into concrete.

2.1.2 The proof load is the yield of a grade 400 (60), #22 (#7) epoxy coated deformed steel reinforcing bar.

3.0 SIGNIFICANCE AND USE

3.1 This ITM is often used to confirm the minimum tensile load required for chemically anchored steel reinforcing bars.

4.0 APPARATUS

4.1 Rotary Impact Hammer Drill. A portable drill with a spinning bit that impacts concrete to create a tubular annular space with a specific diameter and depth.

4.2 Spacer. A 254 mm (10 in.) thick metal plate used to raise the height of the hydraulic ram.

4.3 Hydraulic Ram. Portable mechanism used to supply a tensile load to chemically anchored reinforcing bar.

4.4 Interface 45.5 Mg (100 kips.) Load Cell Device. A portable mechanism that measures the load provided by the hydraulic ram.

4.5 Air compressor or vacuum source of sufficient force to clean the concrete dust from drilled holes.

4.6 Plastic Bottle Washer. A plastic bristled metal handled tubular brush of diameter 30 mm ($1\ ^{1}/_{8}$ in.).

4.7 Two, grade 400 (60), #22 (#7) epoxy coated deformed steel reinforcing bars, 914 mm (36 in.) in length. The top 76 mm (3 in.) will be machine threaded to 3.5 threads per 10 mm (nine threads per inch).

4.8 High strength nut, minimum Rockwell hardness of 25, 22 mm (7/8 in.), threaded to 3.5 threads per 10 mm (nine threads per inch).

5.0 PREPARATION OF TEST SPECIMEN

5.1 Concrete block approximately 0.8 m (2.5 ft)in height, 0.9 m(3 ft) in length, and 1.2 m (4 ft) in width, will be used to anchor a size #22 (#7) reinforcing bar. The block will be a least twenty eight days old with a minimum compressive strength of 27.5 MPa (4000 psi).

5.2 Drill two holes, using a rotary impact hammer drill, in the concrete block. The holes are typically 25 mm (1 in.) in diameter and 230 mm (9 in.) in depth. The minimum spacing between bars will be equal to the embedment depth. The minimum distance from the edge of the concrete block will be 75% of the embedment depth.

5.3 Remove the concrete dust with the high pressure air hose or a vacuum. Dislodge the debris from the sides of each hole with the plastic bottle washer. A metal bristled bottle washer will polish the sides of the hole and reduce the contact area. Use the high pressure air hose or vacuum to remove remaining concrete dust. The hole must be completely clean to facilitate installation of the chemical anchor system.

6.0 PROCEDURE

6.1 Chemically anchor two, grade 400 (60), #22 (#7) epoxy coated deformed steel reinforcing bar in accordance with manufacturer's instructions.

6.2 Allow the chemically anchored steel reinforcing bars to cure for seven days at room temperature.

6.3 Place the 254 mm (10 in.) spacer over the steel reinforcing bar, level with the concrete surface. Shims may be used to level the plate.

6.4 Place the hydraulic ram over the steel reinforcing bar, onto the top of the 254 mm (10 in.) spacer.

6.5 Place the load cell device over the steel reinforcing bar, onto the

top of the hydraulic ram. This action should display only the top treaded portion of the steel reinforcing bar. Additional spacers may be used if necessary.

6.6 Place a washer over the steel reinforcing bar, positioned between the load cell device and the high strength 22 mm (7/8 in.) nut.

6.7 Attach the high strength 22 mm (7/8 in.) nut to the exposed threaded portion of the steel reinforcing bar.

6.8 Apply tensile load at 32 kN/min (7200 lbs./min) until load reaches 160.2 kN (36 kips) the yield of the #22 (#7) bar.

6.9 Release the load and remove the high strength nut, the washers, the load cell device, the hydraulic ram, and the spacer.

6.10 Repeat 7.3 through 7.9 for the second steel reinforcing bar.

7.0 REPORT

7.1 Report the proof load or the maximum load achieved if less than the proof load.

8.0 PRECISION

8.1 There is no precision data available.

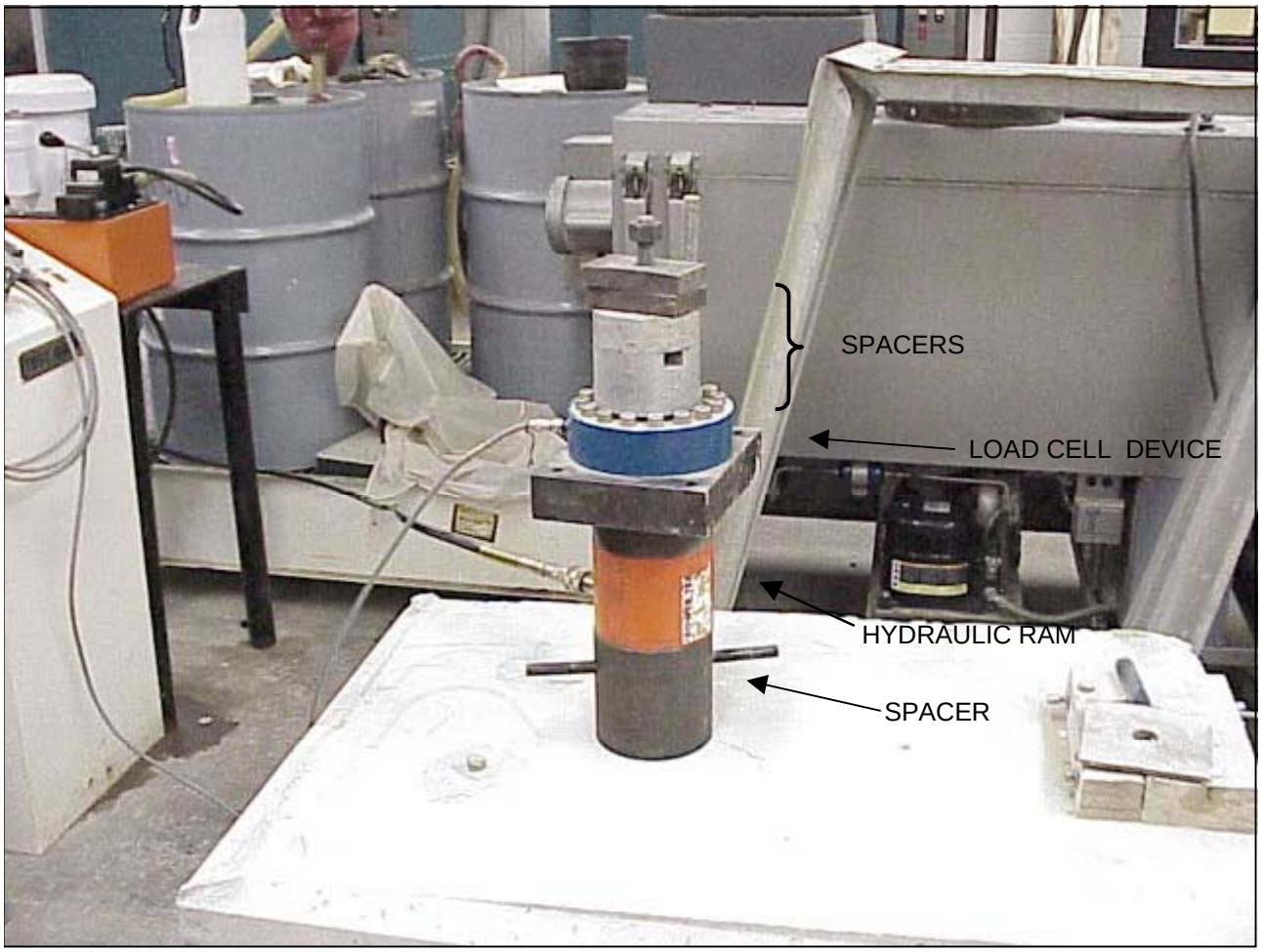

Figure 1